

WHAT IS CLAIMED IS:

1. A liquid ejection head comprising:

a flow path unit including a nozzle having a nozzle opening for ejecting a liquid, and a pressure chamber

5 communicating with the nozzle in which a pressure of the liquid is changed;

a head case on a surface of which the flow path unit is attached so that the nozzle opening is located on the surface of the head case;

10 a head cover attached on the head case for protecting the liquid ejection head, the head cover including

an opening portion from which the nozzle face is exposed,

a frame portion surrounding the opening portion  
15 and supporting a peripheral edge portion of the flow path unit so that the flow path is attached to the head case,

at least one protective wall portion extending from the frame portion so as to cover a side face of the head case, and

20 a support portion formed integrally with the protective wall portion by being bent from the protective wall portion so as to extend to a surrounding direction, the support portion is adjoined to the head case;

wherein a liquid restricting portion for restricting an  
25 invasion and/or storage of liquid between the head case and

head cover is formed on the head case.

2. The liquid ejection head according to Claim 1, wherein the liquid restricting portion is provided as a structure that  
5 the protective wall portion is formed to widen a width of a clearance between the protective wall portion and the head case toward a side of the support portion.

3. The liquid ejection head according to Claim 2, wherein  
10 a clearance widening portion of the protective wall portion of the head cover for widening the width includes a stepped portion at a portion of the protective wall portion.

4. The liquid ejection head according to Claim 2, wherein  
15 the clearance widening portion of the protective wall portion of the head cover for widening the width is formed in a taper shape gradually widening toward the side of the support portion.

20 5. The liquid ejection head according to Claim 2, wherein at a region between a base portion in a shape of a flange and a front end portion of the head case, a groove portion is formed to surround a surrounding of the front end portion.

25 6. The liquid ejection head according to Claim 2, wherein

the protective wall portion of the head cover is formed with an opening portion.

7. The liquid ejection head according to Claim 2, wherein  
5 the support portion of the head cover is formed with an opening portion.

8. The liquid ejection head according to Claim 4, wherein  
the clearance widening portion in the taper shape of the head  
10 cover starts from a location apart from the frame portion to the side of the support portion by a predetermined distance.

9. The liquid ejection head according to Claim 4, wherein  
an opening angle of the clearance widening portion in the taper  
15 shape of the head cover is set to fall in a range of from 7 degrees to 10 degrees.

10. A liquid ejection head comprising:

a flow path unit including a nozzle having a nozzle  
20 opening for ejecting a liquid, and a pressure chamber communicating with the nozzle in which a pressure of the liquid is changed;

a head case on a surface of which the flow path unit is attached so that the nozzle opening is located on the surface  
25 of the head case;

a head cover attached on the head case for protecting the liquid ejection head, the head cover including

an opening portion from which the nozzle face is exposed,

5 a frame portion surrounding the opening portion and supporting a peripheral edge portion of the flow path unit so that the flow path is attached to the head case,

at least one protective wall portion extending from the frame portion so as to cover a side face of the head  
10 case, and

a support portion formed integrally with the protective wall portion by being bent from the protective wall portion so as to extend to a surrounding direction, the support portion is adjoined to the head case;

15 wherein a corresponding portion of the head case fixed with the support portion includes a projected portion projected to a side of the support portion.

11. A liquid ejection apparatus comprising:

20 a liquid ejection head including

a flow path unit including a nozzle having a nozzle opening for ejecting a liquid, and a pressure chamber communicating with the nozzle in which a pressure of the liquid is changed,

25 a head case on a surface of which the flow path

unit is attached so that the nozzle opening is located on the surface of the head case, and

a head cover attached on the head case for protecting the liquid ejection head; and

5 a device for moving the liquid ejection head relative to an object of ejecting the liquid;

the head cover including

an opening portion from which the nozzle face is exposed,

10 a frame portion surrounding the opening portion and supporting a peripheral edge portion of the flow path unit so that the flow path is attached to the head case,

at least one protective wall portion extending from the frame portion so as to cover a side face  
15 of the head case, and

a support portion formed integrally with the protective wall portion by being bent from the protective wall portion so as to extend to a surrounding direction, the support portion is adjoined to the head case;

20 wherein a liquid restricting portion for restricting invasion and storage of liquid between the head case and head cover is formed on the head case.

12. The liquid ejection apparatus according to Claim 11,  
25 wherein the liquid restricting portion is provided as a

structure that the protective wall portion is formed to widen a width of a clearance between the protective wall portion and the head case toward a side of the support portion.

5 13. A liquid ejection apparatus comprising:

a liquid ejection head including

a flow path unit including a nozzle having a nozzle opening for ejecting a liquid, and a pressure chamber communicating with the nozzle in which a pressure of the liquid

10 is changed,

a head case on a surface of which the flow path unit is attached so that the nozzle opening is located on the surface of the head case, and

a head cover attached on the head case for  
15 protecting the liquid ejection head; and

a device for moving the liquid ejection head relative to an object of ejecting the liquid;

the head cover including

an opening portion from which the nozzle  
20 face is exposed,

a frame portion surrounding the opening portion and supporting a peripheral edge portion of the flow path unit so that the flow path is attached to the head case,

at least one protective wall portion  
25 extending from the frame portion so as to cover a side face

of the head case, and

a support portion formed integrally with the protective wall portion by being bent from the protective wall portion so as to extend to a surrounding direction, the support

5 portion is adjoined to the head case;

wherein a corresponding portion of the head case fixed with the support portion includes a projected portion projected to a side of the support portion.

14. The liquid ejection head according to Claim 1, wherein a plurality of the protection wall are provided as said at least one protection wall, and

the liquid restricting portion is provided as a structure\_ \_

5 that an end face in a direction of a width of each of the protective wall portions includes a chamfered portion chamfered so as to reduce a width of each of the protective wall portions along a direction of being apart from the frame portion.

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15. The liquid ejection head according to Claim 14, wherein a width of an interval between the protective wall portions opposed to each other in the plurality of protective wall portions is formed to widen toward sides of the support

15 portions.

16. The liquid ejection head according to Claim 15, wherein widths of interval widening portions of the protective wall portions opposed to each other of the head cover for widening

20 the widths are widened by providing stepped portions at portions of the protective wall portions.

17. The liquid ejection head according to Claim 15, wherein interval widening portions of the protective wall portions

25 opposed to each other of the head cover for widening the widths



are formed in a taper shape gradually widening toward sides of the support portions.

18. The liquid ejection head according to Claim 17, wherein  
5 the interval widening portion in the taper shape of the head cover is started from a location apart from the frame portion to the side of the support portion by a predetermined distance.

19. The liquid ejection head according to Claim 14, wherein  
10 the plurality of support portions integral with the plurality of protective wall portions are constructed so as to be fixed to the head case by screwing and the chamfered portions are formed at end faces of the protective wall portions including the support portions to be screwed contiguous to each other.

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20. The liquid ejection apparatus according to Claim 11, wherein a plurality of the protection wall are provided as said at least one protection wall, and

the liquid restricting portion is provided as a structure  
20 that an end face in a direction of a width of each of the protective wall portions includes a chamfered portion chamfered so as to reduce a width of each of the protective wall portions along a direction of being apart from the frame portion.

21. The liquid ejection head according to Claim 1, wherein the liquid restricting portion is provided as a structure that a notch portion is formed at a vicinity of a boundary between the frame portion and the protective wall portion.

22. The liquid ejection head according to Claim 21, wherein the notch portion is provided at a position which does not interfere with a wiping direction of a wiping device in an operation of cleaning the liquid ejection head.

23. The liquid ejection head according to Claim 21, wherein the frame portion is constituted by a shape of surrounding a peripheral edge of a front end portion formed in the head case, the protective wall portion is constituted by a plurality of protective wall portions to be divided by a plural number from the frame portion to erect and the notch portion is divided by a plural number in a corresponding one of the protective wall portions on which the notch portion is formed.

24. The liquid ejection head according to Claim 23, wherein at least one notch portion of the plurality of notch portions is provided at a position in correspondence with a guide member on a side of a covering member in mounting the covering member for covering the nozzle face when printing is not carried out.

25. The liquid ejection head according to Claim 23, wherein a plurality of protective wall portions are provided as the protective wall portion and at least one of the protective wall portions is not provided with the support portion, the protective wall portion which is not provided with the support portion includes a larger number of the notch portions than a number of the notch portions of another protective wall portion which is provided with the support portion.

26. The liquid ejection apparatus according to Claim 11, wherein the liquid restricting portion is provided as a structure that a notch portion is formed at a vicinity of a boundary between the frame portion and the protective wall portion.